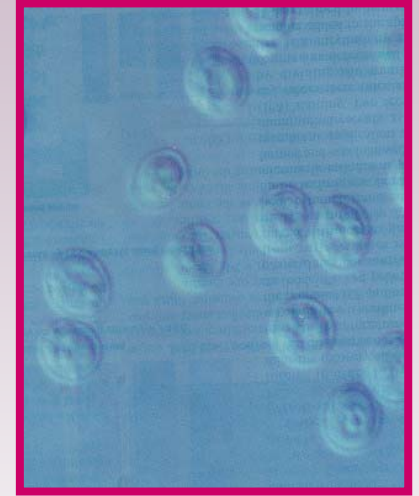
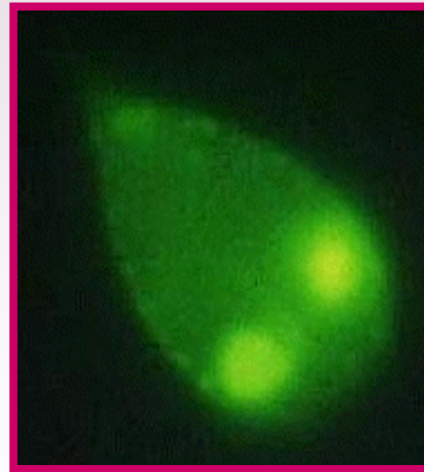


Protozoan Pathogens

■ **Cryptosporidium**



■ **Giardia**



Pathogen Monitoring



- **Added in 1999**
- **Frequency:**
 - **Large WWTPs - Every 2 Years**
 - **Small WWTPs - Every 5 Years**
- **Purposes:**
 - **Learning Tool**
 - **Communicate with Permittees**



DEP Guidelines

■ **Giardia**

- **Average: 1.4 per 100 L**
- **Max: 5.0 per 100 L**

■ **Cryptosporidium**

- **Average: 5.8 per 100 L**
- **Max: 22 per 100 L**



Development of Guidelines

- **1 x 10⁻⁴ Annual Risk of Infection**
- **Assume ALL are 100% Infectious**
- **Average:**
 - **1 mL / day for 365 days**
- **Maximum:**
 - **100 mL on 1 day during the year**



Operational Data

Statistic	TSS	Turbidity	Cl₂
10 %	0.5	0.4	1.8
25 %	1.0	0.6	2.8
50 %	1.0	0.81	4.5
75 %	1.6	1.33	5.0
90 %	2.6	1.8	7.0

Through 10/8/03



Reclaimed Water (# / 100 L)

Statistic	Giardia	Crypto
50 %	4.0	ND
75 %	86	1.18
90 %	334.7	14
Max.	4,035	352.3

Through 10/8/03



Nitrification Data

Statistic	All	w/Nitrif.	wo/Nitrif.
# Obs.	60	46	20
< Detect.	40%	48%	20%
50 %	6.0	3.5	12
Max.	3,096	2,575	3,096
> 5/100L	50%	41%	65%



Type of Filter

Statistic	Deep	Shallow	Upflow
# Obs.	15	25	16
< Detect.	67%	20%	50%
50 %	ND	6.0	17
Max.	3,096	411	2,575
> 5/100L	27%	52%	50%



No Disease!!!

Are they
capable of
causing
infection?

Quality Data

- Revised DEP Form
 - 2006
- EPA Method 1623
- Certified Labs
 - Method 1623 in Nonpotable Waters
- Retesting if “High” Values

